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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/553,037
Filing Date: October 11, 2005
Appellant(s): LICHT ET AL.

Kirsten Grueneberg
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/23/09 appealing from the Office action mailed 1/23/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct. In addition to the claimed processes of making the claimed primary dispersion, there are also claimed directed to coating substrates with the dispersion.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,959,027	JAKUBOWSKI et al.	09-1999
WO 02/064657	LICHT et al.	08-2002
US PAT. APPLICATION	LICHT et al.	04-2004

PUBLICATION

2004/0077777

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

I. Claims 8-9, 21-38, and 40-56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

A. The instant claims 8, 21, 27, 29, 54, 55, and thereby the claims which depend therefrom recite molecular weights regarding polymeric compounds and recite "number average molecular weight". There is not basis in the originally filed specification for number average molecular weight. The appellant's arguments regarding page 16, line 6 of the instant specification and the recited DIN are noted. The appellant's arguments show that an average molecular weight can be associated with the OH number but do not establish how that average molecular weight is number average and not weight average or some other type of average molecular weight (z, viscosity, etc.). The examiner conceded in the prior made lack of clarity rejection that an average molecular weight was necessitated since the moiety is polymeric. It

remains unclear how the originally filed specification establishes that the molecular weight in question is a number average molecular weight. It is noted that polyethers in question are subject to backbiting reactions which give some ethylenic unsaturation which consumes an OH group. It is therefore not clear that the functionality is exactly 2. $\text{OH number} = (56.1(\text{g KOH/mole KOH}) * 1000 (\text{mg/g}) * (\text{number of OH groups per molecule which can be some type of average}))/\text{molecular weight which can be some type of average}$. Not knowing what type of averages are intended makes it impossible to determine the molecular weight type from OH number alone without further information and this further information is not seen at page 16, line 6 of the instant specification. It is not seen what type of average is required by the argued DIN. It is not seen what type of average is required of the argued page 16, line 6 of the instant specification. It is not seen that the OH number of page 16, line 6 is intended to confer any type of relationship to the claimed molecular weight range in question nor to show that the instantly claimed molecular weight range is a number average molecular weight range. It is not even seen that this molecular weight has anything to do with the instantly claimed molecular weight range. It is noted that even if this molecular weight falls within the instantly claimed molecular weight range, it is not necessarily evidence that the exemplified molecular weight is part of the instantly claimed molecular weight range because its polydispersity can be such that the intended molecular weight average type might also be in the instantly claimed molecular weight range though the exemplified molecular weight is not intended to be the molecular weight of the instantly claimed molecular weight range. There is not support in the originally filed specification for the instantly claimed molecular weight being a number average molecular weight.

The appellant's arguments have been fully considered but are not persuasive for the above reasons and the reasons stated below. This rejection should therefore maintained.

II. Claims 8-9, 21-38, and 40-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/064657 Licht et al. as translated by US Pat. Application Pub. 2004/0077777 A1 Licht et al. until the official translation is received in view of US Pat. No. 5959027 Jakubowski et al. and US Pat. No. 4046729 Scriven et al..

Licht discloses a method of making an aqueous primary dispersion falling within the scope of the instant claims at the abstract; sections [0008]-[0043], particularly [0011] which encompasses the instantly claimed components a and b1, [0016] which relates to the relative amounts of polyols, polyamines, and polyisocyanates, [0017], [0022] which encompasses the instantly claimed molecular weight of component b1, [0023]-[0024] which encompasses the instantly claimed polyesterol of claim 33 when the diol is the ethylene glycol or oligomer thereof of section [0024], [0027] which encompasses the instantly claimed b1 when polyethylene oxide is the polyether used, [0029]-[0030] which also meets the instantly claimed component b1 and the amounts of ethylene oxide units of the very broad ranges of the instant claims when taken with the active hydrogen/NCO ratios, molecular weights of the disclosed polyisocyanates, and the molecular weights of the disclosed diols of the reference when these low molecular weight diols are the ethylene oxide oligomers of section [0024], [0031], [0032], [0036]-[0038] which falls within the scope of the particle sizes of the instant claim 34, [0043], page 6, claim 14 which falls within the scope of the instant claim 46 when coupled with claim 13, and the remainder of the document. It is not seen that the dispersing means of the reference use more than the very large amount of shear of the instant claim 28 nor would much shear be required where the

ethylene oxide polyethers of the reference are used since the polymers are expected to be liquid at their lower molecular weights and therefore easily dispersed. The reference teaches coating substrates at section [0060].

Licht does not disclose the use of the instantly claimed component c). It is noted that component c is optional in many of the claims and excluded by claim 56. Licht does not disclose mixing the components, heating them, and adding catalyst via the phases according to the instant claims 27 and 54-55.

Jakubowski discloses making high solids aqueous primary polyurethane dispersions by reacting polyisocyanate, polyols including polyether and polyester polyols, and chain extenders which fall within the scope of the instantly claimed component b3 and which may include chemically incorporated ionic and nonionic stabilizing functionalities (column 5, lines 57-60) which fall within the scope of the instantly claimed component c. See the entire document, particularly the abstract; column 1, lines 54-67; column 2, lines 1-67, particularly 1-54; column 3, lines 1-67, particularly 36-67, which encompass the instantly claimed ethylene oxide containing moieties; column 4, lines 1-67, particularly 1-52; column 5, lines 1-67, particularly 1-4, 10-15, and 57-60, which discloses the use of chemically incorporated anionic and nonionic moieties to stably disperse the polyurethane of the patentee, and 61-67; column 6, lines 1-67, particularly 1-11 and 53-63, noting the particle sizes and polydispersities thereof of the examples; and the remainder of the document. It is not seen that "primary dispersion" does not include the primary dispersions of Jakubowski.

Jakubowski does not disclose the instantly claimed method of making their polyurethane dispersions.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the instantly claimed amounts of ethylene oxide moieties and ionic moieties to stabilize the polyurethane of Licht et al. and to reduce the amount of external emulsifier accordingly because it is well known to use the instantly claimed combinations of ionic groups and ethylene oxide moieties to stably disperse polyurethanes so as to reduce external emulsifier, which is well known to adversely affect film properties and adhesion, as taught by Jakubowski at column 5, lines 57-60 and the fact that the state of the art has been to use both ethylene oxide moieties, in combination with other more hydrophobic moieties, including propylene oxide and other alkylene oxides to stably disperse polyurethanes in water as evidenced by the full disclosure of Scriven et al., particularly the abstract; column 7, lines 44-68; column 8, lines 1-68, particularly 34-67, more particularly 49-51 and 52-55 which encompasses terminating the polyethers with the instantly claimed CH₂OH groups; column 9, lines 1-68, particularly 1-25, more particularly 20-25, which encompasses the instantly claimed polyesterols having the instantly claimed ethylene oxide moieties; column 11, lines 1-68, particularly 1-40 which discloses the instantly claimed component c and its purpose; column 13, lines 1-68, particularly 11-22 column 15, lines 53-68; column 16, lines 1-68; column 17, lines 1-68, particularly 31-53 of which the clear dispersions are understood by those of ordinary skill in the art to be very small particles, often of only one molecule, which are too small to give the Tyndall effect and which would have the instantly claimed particle sizes; and the remainder of the document and the ordinary skilled artisan, at the time of the instant invention was well aware of the effects of using both ionic and nonionic means to stably disperse polyurethanes in water because their affect on the Hydrophile/Lipophile Balance of the polyurethane and the HLB affect on the stability of the

dispersed polyurethane is well known and the patentees encompass the instantly claimed amounts of ethylene oxide moieties and this commonly used means for stably dispersing polyurethanes would have been expected to stably disperse the polyurethane of Licht et al. without the need for external emulsifier while giving the benefits of Licht's method. There are no unexpected results shown, in a manner commensurate in scope with the cited prior art and the instant claims, stemming from the instantly claimed ethylene oxide amounts. The above requires the reacting of the components of the instant claim 8 by the instantly claimed method.

It is not seen that the dispersers of the references cited would use shear above that of the instant claims 9 and 28, particularly where enough hydrophilic portion is present in the polyurethane that it is self dispersing (See Scriven column 5, lines 15-25 and column 17, lines 7-11 and Jakubowski, column 4, lines 23-27 and column 8, lines 20-25) because self dispersing polyurethane reaction mixtures would clearly require little shear to disperse.

Coating substrates according to the instant claims 35-38 is disclosed at Jakubowski, column 7, lines 13-18.

High shear is not required where the polyurethanes have high contents of hydrophilic salt groups and ethylene oxide content since the hydrophilic molecules are readily compatible with water as understood by the ordinary skilled artisan, though most of the instant claims do not exclude high shear. It is noted that the instant claims and the prior art encompass polyurethanes which are self emulsifying.

It is not seen that the average particle sizes of the patentee do not correspond to the z average particle sizes of the instant claims 26 and 34, particularly where the larger amounts of salt and ethylene oxide units are present which make the polyurethane more compatible with water, i.e.

the polyurethane is approaching solubility. Column 12, line 11 of Scriven falls within the scope of the instant claims 40-42.

Component c remains optional in the above claims 27 and those dependent therefrom.

Further consideration of the limitations of amended component c shows that the scope of general formula $RG-R^1-DG$ where there is more than one RG as encompassed by the language "at least one isocyanate reactive group" encompasses the compounds of Scriven, column 11, lines 16-40 cited above because the claimed formula does not recite what carbons the moieties RG and DG are attached to on R^1 , particularly in view of page 9, lines 15-35, particularly dimethylol propionic acid, of the instant specification which defines the claimed formula as encompassing the compounds of Scriven, column 11 et seq., as cited above, having NCO reactive groups and ionic groups. In view of this interpretation of the instantly claimed component c, the appellant's arguments regarding the identity of the claimed component c do not overcome this rejection.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to mix the above discussed components and water, heat them to reaction temperatures of the cited prior art and then add urethane forming catalyst that will go into the water phase, according to the instant claim 27, because such means of mixing will exclude premature reaction of the urethane forming ingredients and will give only the well known effects of the prior art urethane forming catalysts (e.g. Scriven, column 14, lines 20-27) including the ability to lower the reaction temperature and save energy by lowering the activation temperature of the urethane reaction, as is well known to the ordinary skilled artisan.

The appellant's argument that Licht excludes the instantly claimed component c is not persuasive. Licht does not teach away from its use. Licht states that it is not necessary due to their use of emulsifiers. However, the motivation for using the chemically incorporated emulsifying groups rather than external emulsifiers that bleed and materially affect film properties that was present at Scriven's time is equally applicable to Licht and possible therein as shown by Jakubowski, as discussed above. As such motivation that meets the requirements of *Graham v. Deere* and MPEP 2141 is met by the above rejection particularly in view of the "KSR" decision. The cited prior art encompasses the other claimed reactant parameters for the reasons stated above and the teachings of the cited prior art.

It would have been obvious to the ordinary skilled artisan at the time of the instantly claimed invention to add the catalyst and then heat or to add the catalyst after heating, according to the instant claims, because it is not seen that the order of these steps gives an unexpected result or any difference within the scope of the instant claims, which recite no temperatures per se and the reaction will proceed at ambient temperatures without catalyst, and the instant claims recite no time of heating, which due to the reaction kinetics, is material to the outcome of the heating and catalyst used as is catalyst amount, which is not specified. The usual urethane catalysts of the urethane art have hydrophilic parts and hydrophobic parts (e.g. Scriven, column 14, lines 20-22) and the well known tertiary amine urethane catalysts and thus are expected to go into either of the aqueous and oil phases thus meeting these phase aspects of the instant claims. See MPEP 2144.04 C. Changes in Sequence of Adding Ingredients Ex parte Rubin , 128 USPQ 440 (Bd.

App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.).

The appellant's arguments have been fully considered but are not persuasive for the above reasons and the reasons stated below. This rejection should therefore maintained.

(10) Response to Argument

I. The following response relates to the rejection of paragraph (9)I. above:

There is no basis in the originally filed specification for claiming the molecular weights noted above are "number average" molecular weights. The argued section of the instant specification (page 16, line 6) does not mention "number average". The argued hydroxyl number is not stated in the specification to be related to the type of molecular weight claimed. It is not seen that the hydroxyl numbers of the instant specification relate to "number average" molecular weights. The argued DIN 53240-2 does not mention "number average molecular weight". Even the appellant's arguments do not mention "number average molecular weight in relationship with the argued DIN 53240-2. The appellant's arguments merely state that the argued DIN 53250-2 hydroxyl numbers are "always unambiguously connected with exactly one (average) molecular weight of a sample." and "In case the molecular weight of the sample is

distributed over a wide range, the OH number refers to average molecular weight. The examiner notes that these statements do not even say that the hydroxyl number argued gives a “number average” molecular weight. The calculation of the appellant’s arguments does not even relate to the hydroxyl number of 26.7 of page 16, line 6 of the section of the appellant’s specification argued. The calculation of a molecular weight based on a hydroxyl number of 100 and a diol with two OH groups has no basis in the originally filed specification and does not establish that the instantly claimed molecular weight was a “number average” molecular weight at the time of filing the originally filed specification.

There is no evidence in the originally filed specification that the molecular weight noted in the rejection above was a “number average” molecular weight. The recitation of “number average” is therefore new matter because it lacks basis in the originally filed specification.

II. The following response relates to the rejection of paragraph (9)II. above:

For decades the prior art taught against the invention of Licht et al. on the basis that the vast molar excess of water in aqueous dispersions of polyol and polyisocyanate would consume most of the NCO groups and not allow the OH groups to react with the NCO groups. However, Licht et al. now shows that the miniemulsion polymerization of polyols and polyisocyanate in water is possible. Licht et al. does not teach the particulars of the instantly claimed amounts of ethylene oxide and the use of the instantly claimed component c.

The instant claims take a new technology, e.g. that of WO 02/064657, which is translated by US Pat. Application Publication 2004/0077777 Licht et al., and modifies it with old/known means for making hydrophobic polyurethanes stably dispersed in water without need

for surfactants or with the ability to minimize the amount of surfactants used. Surfactants are well known to bleed out of films, discolor them, reduce adhesion of the films, and give other detrimental effects to polyurethanes coated from dispersions containing them. Therefore, for years, as can be seen from Scriven et al., cited above, the ordinary skilled artisan has used hydrophilic groups that are chemically incorporated into the polyurethane to stably disperse it in water. These groups are ethylene oxide chains and/or ionic groups. The broad disclosures of Scriven encompass the instantly claimed components c where they are required. Both Scriven and Licht et al. encompass the instantly claimed ethylene oxide containing moieties. These hydrophilic moieties would have been expected to give the stability of dispersion to the polyurethanes of Licht et al. that they have given to the polyurethanes of Scriven and Jakubowski for the reasons stated above and Licht et al., at paragraph [0027], encompasses the nonionic hydrophilic moieties, e.g. the polyethylene oxide based polyether diols mixed with the other recited alkylene oxides. The instantly claimed amounts regarding the ethylene oxide content of the instantly claimed polyol and polyurethane have not been shown to give unexpected results to the process claimed. The skilled artisan is aware of how to choose the HLB (hydrophile/lipophile balance) of the polymer so that it is stably dispersed in water without the need for external surfactants, as evidenced by the teachings of both Scriven and Jakubowski. This includes choosing the proper amounts of hydrophilic moieties, e.g. ethylene oxide chains and the compounds of the cited prior art that fall within the scope of the instantly claimed component c, to give adequate dispersion stability without reducing the water resistance of the final film too much. This means for stably dispersing polyurethanes would have been expected to function equivalently in the dispersions of Licht. This means for stably dispersing

polyurethanes would have been expected to function successfully in the invention of Licht because of Licht's use of the above noted polyethylene oxides.

The appellant argues that Licht et al. teaches away from using the instantly claimed component c and ethylene oxide chains and amounts thereof, noting paragraph [0014], "Also dispensed with are the additional measures for producing self-dispersibility through incorporation of ionically or non-ionically hydrophilic groups." This does not state that these components are not necessary, as argued by the appellant. This section clearly relates to the "additional measures" per se. The examiner points out that paragraph [0027] specifically teaches that polyether diols of ethylene oxide and mixtures thereof with other alkylene oxide monomers, which have the instantly claimed molecular weights (paragraph [0022]) may be used as the polyol of Licht et al.. This clearly does not teach away from the use of hydrophilic polyethers.

Licht et al. does not teach the use of the instantly claimed component c. The use of component c is taught by Scriven, particularly at column 11, lines 1-68, particularly noting the compounds therein which are also specified in the instant claims such as those of Scriven column 11, lines 24-28 of which the glycine and alanine meet the instantly claimed monoaminocarboxylic acids of the instantly claimed component c, including those of the instant claims 43-44 and 50-51, and Jakubowski (column 5, lines 57-60) and would have been obvious to use in Licht for the reasons stated above.

The catalysts of the above rejection have hydrophilic moieties, e.g. metals or amines, and hydrophobic moieties, e.g. hydrocarbon chains, and will therefore be in both the aqueous and organic phases, at least to some extent, as pointed out in the above rejection.

The case law pointed out in the above rejection addresses the different orders of mixing of components of the instant claims that are not specified by the cited prior art. There is no showing of unexpected results stemming from the instantly claimed orders of mixing the components of the instant claims that is commensurate in scope with the instant claims and the cited prior art.

The coating methods of the above cited prior art encompasses the coating methods of the instant claims 35-38.

The remainder of the appellant's arguments are adequately addressed in the above rejection and prior art disclosures, particularly those sections of the cited prior art cited in the above rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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